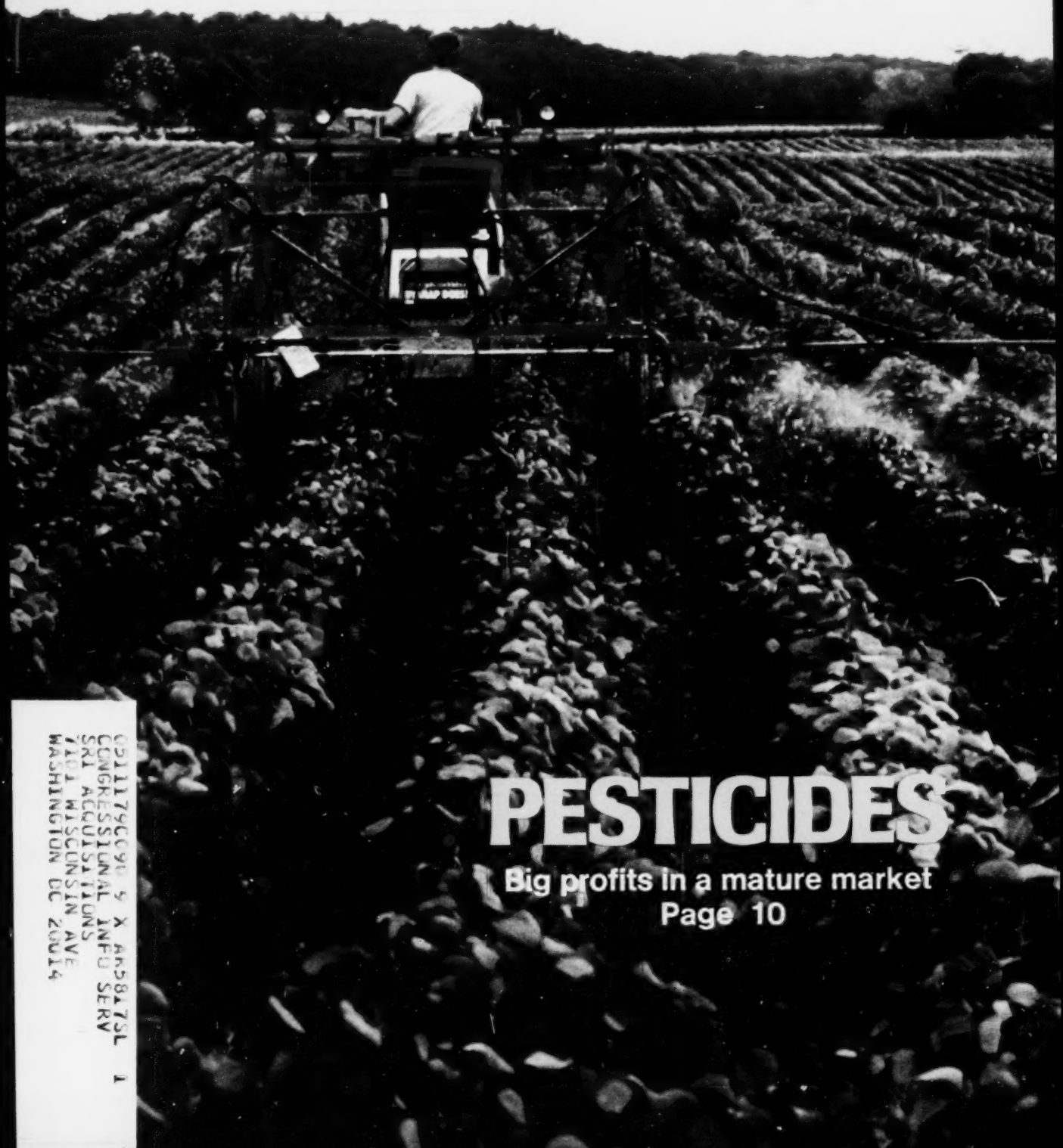
Chemical & Engineering NEWS
April 28, 1980

New policies emerge for small business innovation Page 14



PESTICIDES

Big profits in a mature market

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CHEMICAL EARNINGS SOAR IN FIRST QUARTER

To get a rough estimate of how a U.S. chemical company did in the first quarter of 1980, an outsider need ask only a few questions. How much of its business was in chemicals and plastics close to oil and natural gas? That is very good. How much in agricultural chemicals? Also good. How much in downstream specialties? Not so good. How much in synthetic fibers? Bad. And how much in products going into autos and housing? Very bad.

For the industry as a whole, big profits gains in basic chemicals, plastics, and agricultural chemicals more than outweighed earnings drops in some specialties, fibers, and auto and housing products. As a result, for 20 of the largest U.S. basic chemical companies surveyed by C&EN earnings increased 49% in first-quarter 1980 over first-quarter 1979. Sales advanced 21%. Profit margins on sales rose to 8.5% from 6.9% a year ago.

These gains are somewhat overstated, not just because of standard inflation factors, but because of some unusually large nonoperational gains at some companies. The most important of these by far was a nonrecurring $217.3 million gain at Union Carbide due to major accounting changes (C&EN, Jan. 28, page 6). Without these nonrecurring gains, the industry's earnings rose 30% year-to-year in the first quarter, and the profit margin increased to 7.3%.

At Carbide itself, the more realistic earnings gain, without the accounting changes and with all 1979 figures estimated on a comparable basis, was about 44% in the first quarter of 1980 (41% on an earnings-per-share basis). Carbide's formal earnings figures for the new quarter, including the accounting changes, show an earnings increase of 251%. Carbide's sales increased 19%.

But with or without the nonrecurring earnings figures, the industry's earnings performance in the first quarter was a new peak in both a long business expansion since 1975 and in its all-time record. The 30% earnings gain in the quarter without nonrecurring items was on a par with gains in the previous five quarters since fourth-quarter 1978. The 21% sales gain also was in line with increases since the final quarter of 1978. In other words, the industry's favorable part of the current business cycle has stretched to a year and a half, far longer than many industry economists expected.

However, the celebrating in company reports for the first quarter is notably restrained. Company chiefs see major parts of their business now in the grip of a downturn (probably the first warnings of a spread to other product lines) and feel the bite of big increases in production costs, some of which can no longer be passed along to customers.

The result is some pretty toned-down forecasts for the rest of 1980. For example, Rohm & Haas chairman Vincent L. Gregory Jr. observes that there is little doubt that the U.S. economy is moving into a recession. He notes, as do other industry executives, that the company has kept tight control on inventories, capital spending, and employment, and so should be able to weather the expected contraction.

However, Gregory admits that the company's selling price increases have not quite kept pace with cost increases, causing a drop in profit margins. A weakening economy and continued upward cost pressures make him anticipate continued pressure on profit margins.

A company further along in this cost-price squeeze is Du Pont, whose president, Edward G. Jefferson, told stockholders last week at the company's annual meeting that in the first quarter Du Pont's profit margin on sales sank to 6.9% from 8.4% a year earlier, with particular damage to synthetic fibers.

Perhaps the brightest side of the chemical industry at the moment is fertilizer and pesticides, which greatly aided profits at companies such as Freeport Minerals and Texasgulf. □

First quarter brought a sizable overall profit margin increase

	FIRST QUARTER							
	Sales			Earnings			Profit margin[a]	
$ Millions	1980	1979	% change	1980	1979	% change	1980	1979
Air Products	$378.0	$299.3	26%	$34.2	$24.5	40%	9.1%	8.2%
Akzona	293.2	260.1	13	5.3	9.3	−43	1.8	3.6
American Cyanamid	830.0	753.3	10	38.0	40.7	−7	4.6	5.4
Celanese	847.0	745.0	14	36.0	32.0	13	4.3	4.3
Diamond Shamrock	755.3	505.0	50	56.3	29.5	91	7.5	5.8
Dow Chemical	2,809.5	2,075.4	35	230.5	176.5	31	8.2	8.5
Du Pont	3,567.9	3,020.9	18	244.4	248.4	−2	6.9	8.2
Ethyl[b]	438.6	370.6	18	28.5	21.1	35	6.5	5.7
Freeport Minerals	196.4	105.4	48	35.3	20.2	75	22.6	19.2
W. R. Grace[b]	1,362.0	1,165.9	17	65.1	57.1	14	4.8	4.9
Hercules	646.0	555.0	16	33.7	36.1	−7	5.2	6.5
International Minerals[b]	459.5	374.5	23	39.1	32.7	20	8.5	8.7
Olin	475.2	437.2	9	22.1	17.5	26	4.7	4.0
Pennwalt	302.8	259.3	17	12.3	10.0	23	4.1	3.9
Reichhold Chemicals[b]	236.3	203.4	16	4.2	2.6	62	1.8	1.3
Rohm & Haas[b]	435.7	384.4	13	27.1	28.2	−4	6.2	7.3
Stauffer Chemical	582.9	498.7	17	69.6	62.2	12	11.9	12.5
Texasgulf	280.0	174.3	61	73.6	25.3	191	26.3	14.5
Union Carbide[b]	2,565.6	2,164.8	19	437.2	124.6	251	17.0	5.8
Witco Chemical	285.6	221.6	29	10.5	9.3	12	3.7	4.2
TOTAL[b]	$17,707.5	$14,574.1	21%	$1503.0	$1007.8	49%	8.5%	6.9%

a After-tax earnings as per cent of sales. b Major nonoperational influences on earnings include a $7.3 million gain at Ethyl in first-quarter 1980, a $17.1 million gain at W. R. Grace in first-quarter 1979, a $7.9 million loss at International Minerals in first-quarter 1980 (third fiscal quarter), a $1.9 million foreign exchange gain at Reichhold Chemicals in first-quarter 1980 compared to a gain of $0.4 million in first-quarter 1979, a $3.7 million gain at Rohm & Haas in first-quarter 1979, and a $217.3 million gain for accounting changes at Union Carbide in first-quarter 1980. Without these factors, total earnings in first-quarter 1980 would have been $1284.4 million, an increase of 30% from $986.6 million in first-quarter 1979. Profit margins would have been 7.3% in first-quarter 1980 and 6.8% in first-quarter 1979.

Pesticide profits belie mature market status

Price increases and exports are likely to keep profits strong despite little growth in U.S. market and sharply rising raw materials costs

William J. Storck
C&EN, New York

Pesticide producers in the U.S. are expecting another good year in 1980. Production will be up a modest 3 to 5%, but prices are likely to climb at least 10%. Pesticides' important export poundage once again probably will increase. Thus dollar sales of pesticides produced in the U.S. will continue their steady, highly profitable gains. At no time in the past decade have dollar sales of pesticides fallen.

Oddly, the pesticide market is often described as mature. However, this market defies the usual definition of mature, which implies modest profitability as well as low growth.

In terms of production and sales volume of pesticides in the U.S., the market does indeed appear to be mature. During the past decade, production has increased only about 44% (4% per year), and shipments have climbed only about 47%. Consumption within the U.S. has not regained the peak it reached in the mid-1970's.

However, in terms of sales dollars, the market appears to be anything but mature. During the 1970's prices about tripled, and the value of U.S. production increased about 350% to about $4.2 billion.

In terms of profitability to pesticide producers the market does not look very mature either. Operating (pretax) profit as a percentage of sales ranges from about 20% to more than 40% among U.S. producers. This is a far cry from a mature, low rate of profitability.

Another term that doesn't apply well to pesticides is industry concentration. Some have described the pesticide industry as highly concentrated, that is, limited to a small number of producers. In one sense it is, but by strict definition, it is not.

The discrepancy lies in the nature of the industry. On the one hand, the pesticide industry taken as a whole does not seem to be very concentrat-

Herbicides consumption to grow 5% in 1980

U.S. producers of herbicides expect volume to grow about 4 to 5% this year over 1979. Prices may increase 8 to 12%. Thus, revenues to herbicides producers in 1980 may be up 12 to 15% over 1979.

Growth in herbicides is tied closely to specific markets. For example, producers say that the market for herbicides for soybeans is growing tremendously, to the point that it will soon rival corn as the largest herbicide market in the U.S.

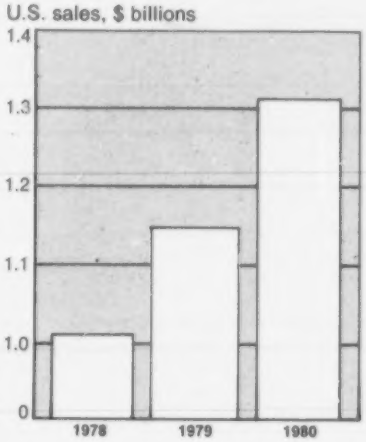
The Department of Agriculture estimates that capacity utilization for herbicide plants in 1980 will be about 77%, up from 74% in 1979. At the same time, production capacity will be expanded about 2%. Capacity utilization and capacity in general are tricky measures of herbicide performance, however, since capacity use for one herbicide can be high while for another it is low.

Like almost every other type of chemical producer, herbicide producers are finding themselves in a cost-price squeeze as the cost of raw materials increases. This is causing producers to consider a change in their pricing methods. According to one company, prices traditionally have been set at the beginning of the planting season, to remain in effect until the next year. That producer is now reviewing prices on a monthly basis so that increases in raw material costs can be passed along.

Herbicide exports are expected to remain strong, amounting to about one sixth of production and 25% of U.S. dollar volume.

The big news in herbicides is postemergent sprays. For the past decade or more, most herbicides have been applied to fields before crop planting. Companies are now working on herbicides that are sprayed on the crops after they have started to grow.

Postemergent herbicides are more expensive than pre-emergents on a cost-per-pound basis, perhaps 50% more. However, on an operational cost-per-acre basis, the difference is smaller, because the grower makes fewer total trips through the field.



One other advantage of postemergents, producers add, is that the growers can identify the weeds they have to kill before spraying. Since herbicides, and indeed all pesticides, are becoming increasingly specific in their actions, postemergent application allows the farmer to determine exactly what he or she must kill before spraying.

The postemergents also are sprayed, in some cases, after the crop is high enough to establish a "canopy," which shades the soil from the sun. This deprives newly sprouting weeds of essential sunlight and prevents them from surviving.

Producers admit that the market for postemergent herbicides is presently small—about $20 million in 1980. However, they predict this market will grow to about $100 million by 1985.

Overall, producers believe that 1980 will be a good year for herbicides. However, they won't be sure until the last dollar is counted, since there are so many variables—how much acreage the farmers plant, how much herbicide farmers decide to spray, and how much raw material costs increase.

ed. There are more than 50 firms in the U.S. making pesticides of one kind or another, and of these, 14 firms account for about 85% of sales. Although this is moderately concentrated, it is nothing like concentration in many chemical commodities and, indeed, in some other specialties, where two or three firms dominate the market.

On the other hand, if one breaks down the industry into specific pesticide products, it is concentrated. A few firms may dominate the market for, say, corn herbicides or tobacco plant growth regulators. Further entry into these markets may be barred effectively by the grower's buying habits and by the high cost of developing new, safe pesticides.

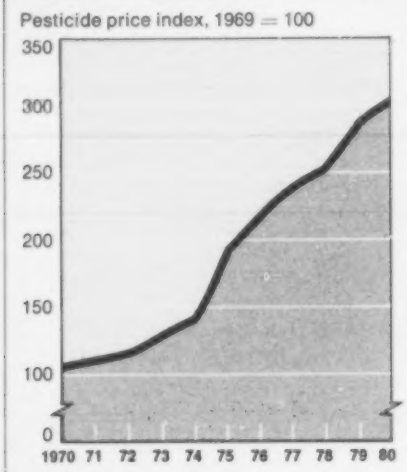
A timely example of this is the relatively new market for synthetic pyrethroid insecticides. Three firms in the U.S.—Shell, ICI Americas, and FMC—are heavily involved in research, development, and marketing of these compounds. The potential for pyrethroids seems to be very great, according to pyrethroid producers and producers of more traditional pesticides. But they all agree that if a company has not already made a substantial investment, it essentially will be shut out of the synthetic pyrethroid market, because of the market share that has been grabbed by the companies already involved.

The cost of entry to the pesticide market is indeed high. Besides the traditional costs of developing a compound and building the plant to produce it, there are costs of proving to the Environmental Protection Agency that the compound is safe. Proof to EPA costs time in addition to dollars. To hasten the process, most U.S. pesticide producers have established research facilities in warmer climates outside the U.S. to get at least two and perhaps three plantings per year for testing.

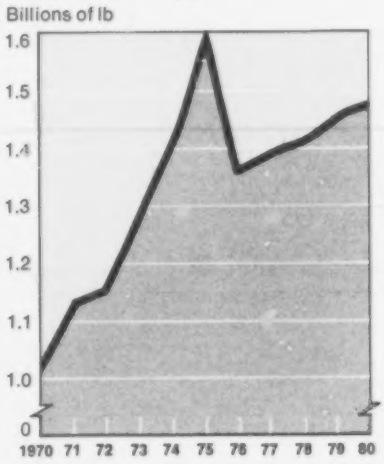
Testing outside the U.S. can provide another benefit. Producers often receive approval for pesticides from foreign countries before they do in the U.S. Thus, they can get some return on their investment by selling in the foreign markets while they are awaiting approval in the U.S.

An early start is very important to producers because of pesticides' limited patent life. In this respect, pesticides are like pharmaceuticals: By the time all the safety testing is completed, a significant portion of the patent life has elapsed. According to

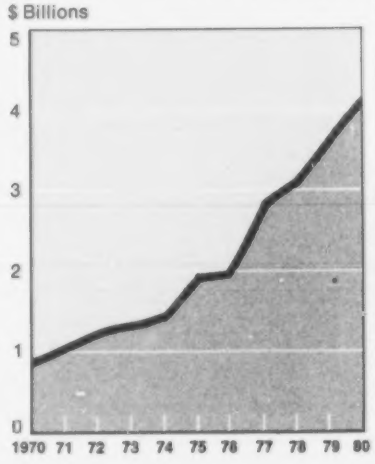
Pesticide prices have almost tripled in decade . . .



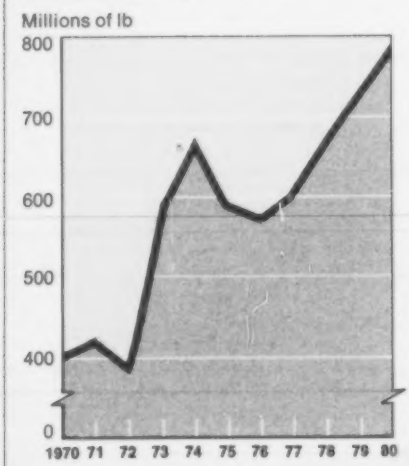
. . . while production has climbed 43% . . .



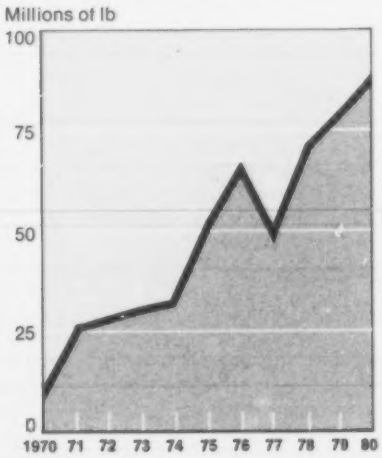
. . . causing value of U.S. production to surge 350%



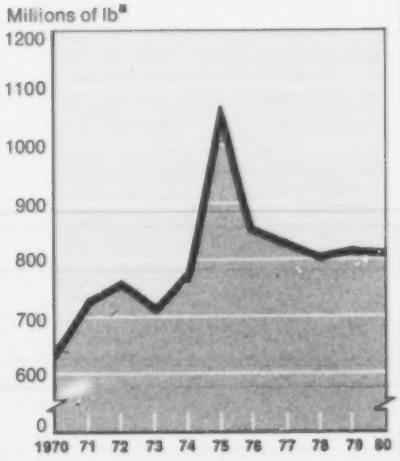
Pesticide exports nearly doubled in 1970's . . .



. . . and imports are up almost eightfold . . .



. . . but U.S. consumption peaked in mid-decade



a Apparent consumption is production minus exports plus imports. Exports include carriers and inert ingredients in volume. Other volumes are mostly on an active ingredient basis. **Sources:** Department of Agriculture, C&EN estimates

Insecticide fortunes to improve in 1980

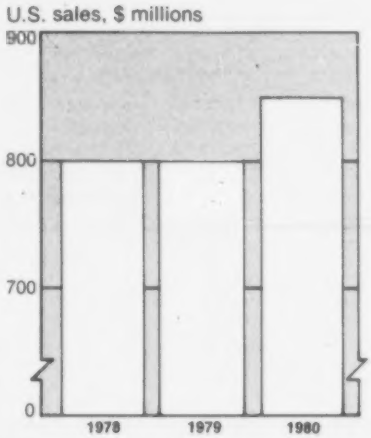
There is hardly any doubt that 1980 will be a better year for insecticide sales than last year. This is partly because 1979 was not a very good one for insecticide producers.

Use of insecticides is expected to increase 8 to 10% from 1979. However, production will not be up this much because of inventories carried over from last year. The U.S. government estimates that inventories are 38% greater than they were at the beginning of 1979.

A light infestation of insects in the cotton crop last year caused the increase in inventories. This left cotton growers with some carry-over at the end of the season. However, producers say that such a light infestation is unusual two years in a row. Therefore, although the inventories likely will be used by cotton growers in 1980, insecticide production may be off somewhat because of them.

As with herbicides, insecticide prices are on the increase—up about 10% over last year. And they may go even higher if producers begin monthly price reviews.

However, insecticides are not a fast-moving market. One consultant tells C&EN that the dynamics of the insecticide industry are dictated by insects' slow rate of developing resistance to existing insecticides. Although this may be an oversimplification, it is true that the insecticide market in the U.S. remained at a static $800 million in 1979. In 1980, it is expected to increase to about $850 million, mainly because of price increases.



As is the case with herbicides, a large proportion of U.S. production of insecticides (about one third) is shipped overseas. Imports make up less than 1% of U.S. supply.

Also like herbicides, there is a relatively new development in insecticides. This is the synthetic pyrethroids. These insecticides, which are a synthesized version of the extract of the pyrethrum flower, are much more biologically active than are traditional insecticides. Thus, application rates are much lower—in some cases one 10th the rates of more traditional insecticides such as organophosphates.

However, pyrethroids cost more. It costs about $3.85 per acre for a mixture of organophosphates compared to about $6.00 per acre for synthetic pyrethroids. The question then becomes: Are the benefits worth the additional cost?

Some producers are betting that they are. Producers of synthetic pyrethroids say that the product is "supereffective." They claim that besides killing insects it has no negative effect on plant growth. Indeed, plants seem to mature earlier when treated with the pyrethroids. Producers also say that pyrethroids are very specific for insects and have absolutely no effect on livestock or humans. One other apparent benefit is that, thus far, producers have seen no resistance to these compounds built up in insects.

Producers also claim that although the cost per acre for pyrethroids is high, the cost per crop may not be. They say that fewer applications may be needed because of the greater effectiveness of pyrethroids and because of a shorter growing season due to the earlier maturity pyrethroids afford crops.

Evidently cotton growers, who use most of the pyrethroids output, agree. Producers claim to have captured about 50% of the market for control of worms in cotton after only two to three years. This amounts to explosive growth to about a $75 million market.

Pyrethroid producers also are seeing rapid growth in use of their product for vegetables, and field corn and soybeans offer good potential. In fact, growth is so fast that producers can cite no accurate estimate of eventual size other than "very big."

some estimates, the time during which developers can recoup their investment on a pesticide is eight to 10 years of the 17-year U.S. patent life.

After a patent expires, generic producers can enter the marketplace, increase competition, and drive down prices and profits.

Producers point to atrazine, one of the leading herbicides for corn, as an example. The patent held by Ciba-Geigy expired, and at least two other companies entered the market. The result was that the price of atrazine to corn growers fell considerably. Producers try to get around this somewhat by trying to delay patent issuance as long as possible after the initial filing.

For the long term, there is one practice evolving that will have tremendous impact on pesticide producers—integrated pest management. Under this concept, all types of pest control—cultural, chemical, inbred, and biological—are integrated to control all types of pests.

The chemical controls include all of the traditional pesticides. Cultural controls consist of cultivation, crop rotation, optimum planting dates, and sanitation. Inbred plant resistance involves the use of varieties and hybrids that are resistant to certain pests. And biological control involves encouraging natural predators, parasites, and microbials.

Under this system, pest detection scouts measure pest populations and determine the best time for applying pesticides. According to a study by the Office of Technology Assessment, integrated pest management could reduce pesticide use up to 75% on some crops.

There are two big problems with integrated pest management, however. The first is getting farmers to accept the concept. In many cases, they prefer to spray one chemical to control everything rather than spray for specific pests. As evidence of this, the biggest insecticides in terms of sales are still nonspecific, broad-band chemicals. A second and related problem is expanding the program from its relatively small base to one that is nationwide. This will not happen until a way is found to get full acceptance from farmers and to train enough scouts to carry out the program.

So for the time being, pest control probably will remain as it has been. Producers are going to sell increasing amounts of pesticides at higher prices. Over the next five years, volumes are slated to increase from 2 to 7% annually. And price increases probably will average at least 10% per year.

For 1980, farmers are expecting a good planting season. And if all conditions were normal, U.S. pesticide producers would be looking forward to the coming year. However, there are some big uncertainties. One is how much pesticide farmers will use this year. Producers say that farmers' financial liquidity is very low. This, combined with high interest rates, may cause them to think twice (or even more) about high application

Plant growth regulators: good growth, small market

Plant growth regulators have the smallest market among all the major pesticide categories—about $129 million in the U.S.—but they also show the fastest growth.

Producers project that plant growth regulators will continue their historic, 11% growth in volume through the next two years. After that they expect growth to slow somewhat.

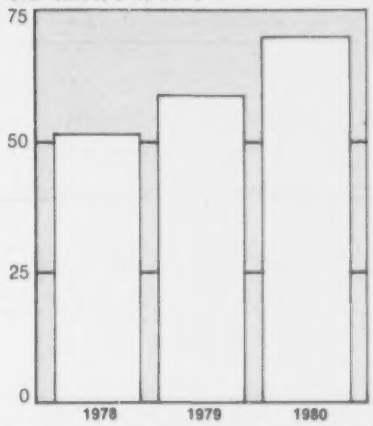
The plant growth regulator market is made up of two distinct entities—growth regulators and harvest aids. Growth regulators are used to increase crop yield or quality. Harvest aids, as the name implies, are used at the end of the crop cycle. For instance, harvest aids defoliate cotton before picking or desiccate potatoes before digging.

The largest U.S. market for plant growth regulators is indeed in harvest aids for defoliating cotton. The market value for this is about $23 million. This is followed by the tobacco market, where growth regulators control "suckers," thus increasing yield. Value of this market is about $12 million in the U.S. PGR exports are very small compared to other pesticides.

Producers say that plant growth regulators are priced on a very high value-added basis, since they are used to decrease labor or to enhance crop yield. Price increases for 1980 generally fall in line with the rest of the pesticide industry at about 8 to 12%.

Unlike herbicides or insecticides, however, there are no big new developments in plant growth regulators, and this worries producers.

In fact, for most of the big use regulators, patents either have expired or will expire in the near future. Thus, generic producers of regulators are making inroads on the market. For example, Uniroyal's maleic hydrazide, used on tobacco and potatoes, has been off patent for some time, and other producers have



entered the market. In another case, GAF has broken Union Carbide's Amchem division's patent for Ethrel, a ripening aid, and the two companies are in court over it.

The big problem is that there has been a tremendous gap in development of new plant growth regulators. There has been no development of a potentially large-volume plant growth regulator in years. Thus, generic producers are able to take away market share in the older, larger markets.

The big work now is to find products for use on high-volume crops such as corn. Producers say that they are now looking at pioneering biochemical developments. In these, the biochemical process of the plant would be interrupted to produce beneficial results.

In a crop such as corn, for instance, producers are trying to develop a substance to enhance the starch-making process. Some of the starch that is produced by the plant is consumed as energy. If producers can develop a substance that will produce more starch, it will lead to healthier plants and bigger yields than farmers are now getting.

rates of pesticides. Growers may decide that they can cut their pesticide applications without cutting their financial return too much.

However, producers still figure that pesticide use will increase at least 3% over last year. Thus sales would be up 12 to 15%.

Capacity use at pesticides plants is due to decline somewhat to about 78% this year from 80% in 1979, according to a survey by the Department of Agriculture. Most of this decline will be in insecticides.

Exports of pesticides likely will continue to grow but at a slower rate than in the 1970's. This is largely due to increased production capacity in foreign countries.

At the same time, raw materials and energy costs for making pesticides are expected to continue rising. Pesticides, which are in many cases petroleum-based, are not increasing in price fast enough to make up for the increases in raw material cost. For example, according to one estimate, the cost of solvent to producers will increase at least 25% in 1980. However, raw material availability seems to be no problem at these higher prices.

Thus, a few uncertainties notwithstanding, it's likely that 1980 will be another fairly good year for pesticide producers with prices up, use up, and profit margins under pressure but still high. □

CHECKOFF

NEW PLANTS

■ **Aluminum.** Martin Marietta Aluminum plans to expand capacity of its reduction plant at Goldendale, Wash., from 120,000 tons to 185,000 tons of aluminum per year at a cost of $125 million. Kaiser Engineers Inc., subsidiary of Raymond International, will handle engineering and other work on the project, which is scheduled to be completed by late 1981.

■ **Fertilizer.** Union Oil plans to build 200,000 ton-per-year liquid urea-ammonium nitrate (UAN solution) plant west of Sacramento, Calif. Plant will cost $10 million and be completed by spring 1981.

■ **Oxygenated organics.** Oxirane Chemical will debottleneck units at Bayport, Tex., plant to increase output of propylene oxide about 100 million lb annually and of *tert*-butyl alcohol about 440 million lb annually. When work is completed at end of 1980, capacities will be 1 billion lb propylene oxide and 2.0 to 2.5 billion lb *tert*-butyl alcohol.

■ **Polyethylene.** Exxon Chemical plans to build 200,000 ton-per-year, high-density polyethylene plant at Mont Belvieu, Tex. Exxon will use technology licensed from Asahi Chemical Industry Co. of Japan involving modified Ziegler-type catalyst; plant scheduled for completion in 1983.

■ **Polyethylene.** Allied Chemical will expand capacity for its line of low-molecular-weight polyethylenes at Orange, Tex., 25% to unspecified level; plant scheduled for completion in late 1981.

PLANTS COMPLETED

■ **Alkylphenols.** GAF Corp. has expanded capacity of its Linden, N.J., plant for these intermediates used in surfactants at a cost of $1 million; size of expansion not disclosed.

■ **Ethanolamines.** Texaco has reached planned operating levels at new plant at Port Neches, Tex. Plant doubles company's capacity to 150 million lb a year.